

Multinational Interoperability Requirements – A Core Competency

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Abstract

Multinational coalitions are the standard for land forces in the full spectrum of land warfighting from operations other than war to armed conflict. Recent events in Bosnia, Kosovo, and East Timor necessitate interaction among the peacekeeping participants, most notably through the channels of liaison. Automation of routine liaison tasks will bear a significant improvement in facilitating accurate command and control (C2) information exchange. Routine tasks handled through automation will complement the tasks of the liaison officer or cell. This is especially true when the spoken language is not common. Multinational requirements in support of liaison and defined in the C2 information system (CCIS) are vital to gaining interoperability among multinational coalitions. However, the current process of defining multinational C2 requirements is flawed. The service tradition of working service requirements first, then joint requirements, and finally multinational requirements is a long-standing sequential process that mimics the implementation process. Funding also reflects this sequence. This paper makes the case that this sequence is backwards, and although it may be unrealistic to expect to change this order for the implementation process, there are no technical impediments that prevent reversing this order for the requirement definition process.

1. Introduction

Recent operations in Bosnia, Kosovo, and East Timor illustrate the uncertainty of today's strategic security environment and the increasing importance of multi-national coalitions. Unilateral action by U.S. forces is occurring less frequently yet our automated systems are largely unable to interoperate with those of other nations, including and most disturbingly our oldest and closest allies. Our involvement in each of the aforementioned operations necessitated ground command and control (C2) interaction among the coalition participants. This was accomplished most notably through the channels of liaison – at best with rudimentary automation.

The use of ad hoc automation has historically resulted in a myriad of problems, in many cases unnecessarily hindering the force. This weak foundation in automation interoperability is evidenced by inefficient procedures. Examples of this include increased probability of error resulting from multiple entry of common data, and information overload resulting from the use of unstructured information exchange mediums, such as VTC, FTP, e-mail, fax, etc.. Any of these examples is potentially debilitating to the mission. In October 1997, the Civilian/Military Affairs Officer of the Sustainment Force (SFOR) headquarters in Bosnia had 800 e-mails in

queue and was at a loss for what was important. Given reductions in force that all the major allies have faced or are facing, it is now even more important to leverage the computational power that automation affords.

U.S. Joint doctrinal publications espouse the importance of joint and multi-national operational capabilities. Joint Pub 1, entitled *Joint Warfare of the U.S. Armed Forces*, pays special attention to multinational operations and is a guide to those endeavors [Powell, 1991]. In fact, the 1781 campaign of Yorktown is cited as a decisive joint and coalition victory in the preface. Multinational coalitions, therefore, have been and will be the standard for land forces in the full spectrum of land warfighting from operations other than war to armed conflict. The US perspective is to operate from a basis of partnership and mutual respect with regards to multinational operations.

In all likelihood, prominent countries will seek each other out rather than act alone in a crisis situation [US-CREST, 2000]. The challenge then is to be prepared for operations as a coalition team. Therefore, proactive use of our technology to automate the command and control (C2) of our multinational coalitions will be at the heart of our success.

2. Core Essential C2 Requirements

The first step to any successful undertaking is the identification of requirements. This is further supported by U.S. doctrine that establishes the readiness requirement that our armed forces operate in a multinational environment [Powell, 1991]. Readiness means being prepared and it imposes greater emphasis on the requirements definition step and for agreements on a mutual approach to achieve automated C2 interoperability.

This paper introduces the notion that multinational, and not service or national, requisites should form the core of C2 requirements and presents a methodology for developing common requirements for the purpose of an automated C2 solution for the multinational coalition environment.

Automation must handle routine information, permitting the operational community to return their focus to the full range of military operations. The requirements development process, from the identification of operator's functions through conceptual data and information definitions, must isolate routine tasks that lend themselves to automation [Spewak, 1992]. Routine tasks handled through automation will then complement the execution of duties of the liaison officer or cell. The primary functions of the liaison officer are to relay the commander's intent which are non-routine in nature and not easily adapted for either message or transaction processing [QACISIG, 1997]. Many routine tasks handled through liaison channels are suitable to automatic processing, e.g., control measures identification, position location reporting, and organizational status. Automation of routine liaison tasks will, therefore, bear a significant improvement in facilitating accurate command and control (C2) information. This is especially true when the spoken language among the participants is not common exchange and when the man in the loop transposes data. The capture and validation of multinational requirements in support of liaison and defined in the automated process of the national CCIS is, therefore, vital as a first step in gaining interoperability among multinational coalitions. The second step of the

process, separating requirements into what can be automated and what can not, ensures that the computational power of the CCIS can be appropriately leveraged.

The current process of defining multinational C2 requirements, however, is reversed. The service tradition of working service requirements first, then joint requirements, and finally multinational requirements is a long-standing sequential process that mimics the implementation process. Funding also reflects this sequence. This sequence should be reversed, or at least concurrent. Concurrent requirement determination would enable establishment of joint and multi-national requirements as the core of service requirements. This will facilitate not only service, but joint and multi-national interoperability as well. Although it is unrealistic to expect to change this order for the implementation process, there are no technical impediments to prevent changing the requirement definition process.

The process of righting the requirements sequence began in earnest in April 1999 when six countries (Canada, France, Germany, Italy, the United Kingdom, and the United States) began building to a single C2 requirement for automating multinational interoperability. After six months of intense debate, the six operational representatives adopted a 'keep it simple' approach and focused on the basic automated interoperability requirement: situational awareness.

3. Multilateral Interoperability Program

On 25 October 1999, members of the six countries, bounded by the Multilateral Interoperability Program (MIP), signed the MIP Tactical CCIS Interoperability Requirement (MTIR) [MITR, 1999] in Treviso, Italy. Using a building block approach, the MTIR outlines the C2 requirements necessary to ensure that multinational, joint, and service C2 needs are met for C2, support and proximity. In addition, six countries (Australia, Austria, the Netherlands, Spain, Belgium and Denmark) joined the MIP as observers. Australia is an important observer to the MIP as the Australians are ABCA members. Possible import of MIP products into ABCA requirements documents means that MIP standards could serve as a baseline in the Pacific Rim countries, many of whom participated in the East Timor operations.

The MIP solution offers a specific methodology to ensure that the core set of multinational requirements remains fully synchronized in realistic, maintainable, and tractable components that facilitate evolving extensions to the MIP implementation. While the initial MTIR focus is on warfighting requirements, future development of requirements in the areas of joint, civil-military, humanitarian, media, and peacekeeping operations have been identified. The MIP Operational Working Group (OWG) will serve as the owner and maintainer of the MITR document, and will develop information exchange requirements for these areas that will be the future extensions to the MIP solution.

The MIP management approach was agreed upon a year earlier in 1998 by the original six nations. The cornerstone that establishes the common methodology for implementation is described in the MIP Program Management Plan [MMG, 1998]. The aim of the MIP is to automate C2 at the corps through battalion echelons, or lowest appropriate level. To achieve this goal working groups were formed to address operational, procedural, and technical C2 areas. This is the MIP methodology: an interlocking series of working groups representing the views of the owner, architect, and builder [Spewak, 1992]. Design reviews are continuous, as the process

is fraught with potential occurrences of misinterpretations and misunderstanding. No process is ever perfect, but the MIP management approach addresses the challenge with a structured methodology that is requirements driven unlike many of those seen in the experimentation process.

The Operational Working Group (OWG) has the responsibility to select the initial set of minimum essential C2 requirements that not only satisfied the core warfighting requirement but also identified routine tasks for automation. A minimum essential set was identified because the MIP community had to demonstrate that the application of computing power against a core C2 requirement would produce results in the near term, therefore, November 2001 was chosen as the first demonstration with a fielding decision of the program. To achieve this goal, the core domain was selected for which a minimal set of requirements could be realistically defined. The MIP requirement revolves around two essential facets of command and control (C2) information: the operations order (OPORDER) and situational awareness (SA). The three parts of the OPORDER, header, geometry, and task organization, enable SA. The MTIR details these requirements in Annexes D, E, and F, and describes the minimal extent of a commander's view of the battlefield – in accordance with doctrinal baselines – as being information from one level up, two levels down, and from the flanks. The MTIR actually defines appropriate data structure and data dissemination rules that generate a multinational common picture for the commander and the staff.

Within the context of the MIP, the TRADOC¹ Program Integration Office for the Army Battle Command System (TPIO-ABCS) conducted a two-year study of core C2 requirements with emphasis on the integration of multinational requirement within the essential set of C2 requirements. The result was a radical change in thinking about multinational C2 requirements. After 18 months, it was discovered that the “core requirements” provided the minimal information to satisfy not only the multinational requirement, but also the joint and service C2 minimum essential set of exchange requirements. *In other words, the joint and service C2 requirements are actually super sets of the multinational core requirements.* This is illustrated in Figure 1. Multinational C2 requirements, therefore, must be considered a core competency of the service and joint requirements definition process.

The service, joint and multinational military organizations must build to a single requirement. Any other approach will result in solution sets that lead to an uncoordinated requirement that is neither interoperable nor affordable. The core competency set of developmental building blocks are user defined conceptual data, data dictionaries, and data models and must include an agreed interface exchange requirement among multinational participants in the program.

A secondary aim of the MIP is to ensure that no MIP stovepipe solution is ever built. The issue for the OWG became the export of the MIP requirement. Thus, the MIP solution, as defined in the MTIR annexes for OPORDER and SA, must be exportable across organizational, service and national lines. Work is currently ongoing to adopt the MIP solution in NATO through the NATO Army Armaments Group (NAAG) Land Group 1 (LG1). With access to 26 NATO and Partnership for Peace (PfP) nations, LG1 became a conduit for MIP products. Through the efforts of MIP member nations sitting in LG1, it has adopted the MIP program of work as its

¹ United States Army **T**rainning and **D**octrine Command, commanded by a four star general.

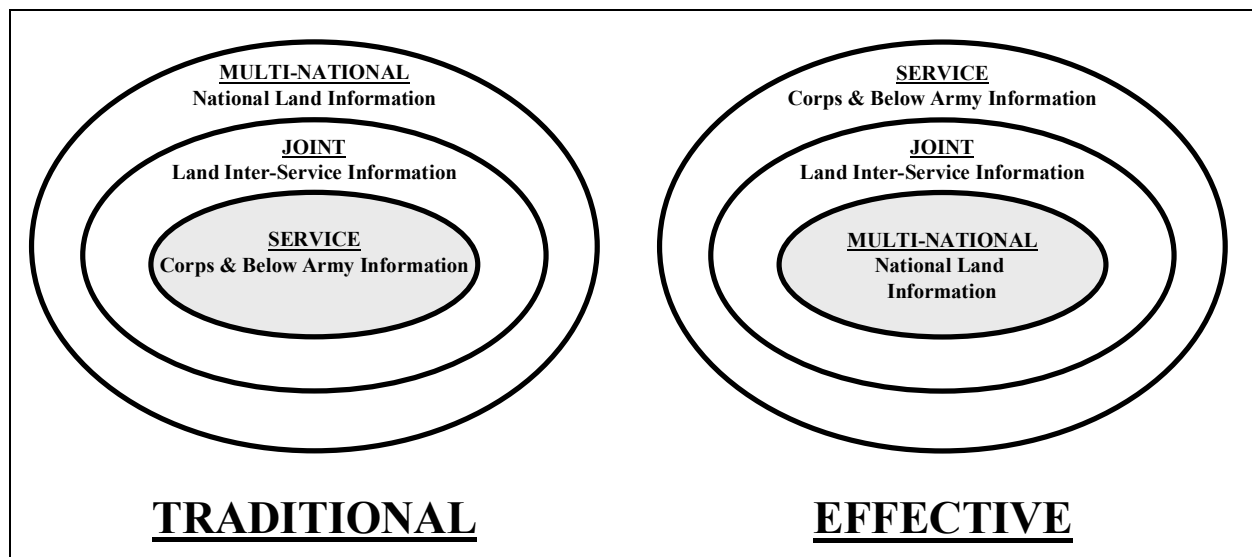


Figure 1: Two Perspectives of the Core Essential C2 Information Formulation Process

own [OIP-NATO]. This is an important milestone as LG1 seeks to harmonize data implementation efforts. LG1 is a forum where the Army Tactical C2 Information System (ATCCIS) initiative and its data model, now known as the Land C2 Information Exchange Data Model (LC2IEDM), is under review. The LC2IEDM is under evaluation by MIP as its baseline. Furthermore, a proposal by the chairs of both the ATCCIS and MIP OWGs is now under consideration by their parent organizations for the synchronization of work and an ultimate merger by 2002. At this point, it is clearly recognized that the MIP is on its way in establishing a single requirement for minimum essential C2 within the NATO environment.

The MIP solution is also under consideration by the U.S. Multi-Service C2 Flag Officer Steering Committee (MS C2 FOSC) as the basis of multi-Service C2 interoperability work [OAC, 2000]. MTIR requirements have been reviewed by the US Army, US Marine Corps, and Special Operations Command (SOCOM) under the auspices of the MS C2 FOSC for use as the baseline for an integrated ground picture. The adaptation of a single integrated ground operational picture with an air picture has been proposed that would ultimately provide a single common picture for the joint force commander. At this time, the MS C2 FOSC's O-6 Advisory Council is recommending the MTIR as the baseline for the integrated ground picture [OAC, 2000].

It is the intent of the US Army to include the MIP requirements in the Army Battle Command System (ABCS) Common Services Operational Requirements Document (ORD). The Common Services ORD sets the specifications for the national implementation for ABCS [TPIO-ABCS, 2000]. It is through this ORD, that the requirement generation cycle comes full circle, from its multinational inception through its joint and Service super sets. This means that on the US side, C2 requirements forge a single set of requirements. It is no longer acceptable to specify separate interfaces with each individual multinational systems (e.g., singly requiring that the US Army's Maneuver Control System (MCS), interoperate with the Italian Sistema Automatizzato di Comando e Controllo (SIACCON)). Instead, there must be agreement on a common interface at multiple levels so that the US Marine Corps Tactical Combat Operations (TCO) can also interoperate with SIACCON in the same manner it does with MCS.

4. Conclusion

Three topics have been presented: first, that the MTIR requirements are the C2 core requirement and joint and service C2 requirements are simply super sets of these, second, that the export of the MTIR to other multinational domains can lead to a single C2 core requirement, and third, a structured approach to discerning automation requirements improves the likelihood of success and adaptation.

The time has come to promote the multinational interoperability requirement to its rightful place as a core competency of command and control. Further, this must be reflected in terms of both requirements generation and funding. The recent US experience with automating command and control processes has shown us nothing less. There are no advantages to delaying the exploitation of automation in support of liaison at a time in history where instances of multinational operations are more important than ever before. Suspending the multinational aspects of information sharing in the requirement determination process will only lead to a more costly retrofitting of command, control, and information systems.

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